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**UTILITY  
PATENT APPLICATION  
TRANSMITTAL**

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No. \_\_\_\_\_

First Inventor or Application Identifier Rivas

Title Pulse Rate ... Monitoring Glasses

Express Mail Label No. \_\_\_\_\_

**APPLICATION ELEMENTS**

See MPEP chapter 600 concerning utility patent application contents.

Assistant Commissioner for Patents  
Box Patent Application  
Washington, DC 20231**ADDRESS TO:**

1. ☒ \* Fee Transmittal Form (e.g., PTO/SB/17)  
(Submit an original and a duplicate for fee processing)
2. ☒ Specification [Total Pages 12]  
(preferred arrangement set forth below)
- Descriptive title of the invention
  - Cross References to Related Applications
  - Statement Regarding Fed sponsored R & D
  - Reference to Microfiche Appendix
  - Background of the invention
  - Brief Summary of the invention
  - Brief Description of the Drawings (if filed)
  - Detailed Description
  - Claim(s)
  - Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 3]
4. Oath or Declaration [Total Pages 3]
- a. ☒ Newly executed (original or copy)
  - b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d))  
(for continuation/divisional with Box 16 completed)
  - i. ☐ **DELETION OF INVENTOR(S)**  
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

5. ☐ Microfiche Computer Program (Appendix)
6. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
- a. ☐ Computer Readable Copy
  - b. ☐ Paper Copy (identical to computer copy)
  - c. ☐ Statement verifying identity of above copies

**ACCOMPANYING APPLICATION PARTS**

7. ☐ Assignment Papers (cover sheet & document(s))
8. ☐ 37 C.F.R. § 3.73(b) Statement of Power of Attorney (when there is an assignee)
9. ☐ English Translation Document (if applicable)
10. ☐ Information Disclosure Statement (IDS)/PTO-1449 [Copies of IDS Citations]
11. ☐ Preliminary Amendment
12. ☒ Return Receipt Postcard (MPEP 503)  
(Should be specifically itemized)
13. ☒ \* Small Entity Statement(s) [Statement filed in prior application, Status still proper and desired (PTO/SB/09-12)]
14. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
15. ☐ Other: \_\_\_\_\_

**\* NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).**

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. \_\_\_\_\_

Prior application information: Examiner \_\_\_\_\_ Group / Art Unit: \_\_\_\_\_

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

**17. CORRESPONDENCE ADDRESS**☐ Customer Number or Bar Code Labelor ☒ Correspondence address below

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Signature	<i>JCWray</i>	Date	9/16/99

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**STATEMENT CLAIMING SMALL ENTITY STATUS  
(37 CFR 1.9(f) & 1.27(b))--INDEPENDENT INVENTOR**

Docket Number (Optional)

Applicant, Patentee, or Identifier: Victor A. Rivas, Richard Soltis and Lawrence E. Sternberg

Application or Patent No.: \_\_\_\_\_

Filed or Issued: September 16, 1999Title: Pulse Rate, Pressure and Heart Condition Monitoring Glasses

As a below named inventor, I hereby state that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

☒ the specification filed herewith with title as listed above.☐ the application identified above.☐ the patent identified above.

I have not assigned, granted, conveyed, or licensed, and am under no obligation under contract or law to assign, grant, convey, or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern, or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

☒ No such person, concern, or organization exists.☐ Each such person, concern, or organization is listed below.

Separate statements are required from each named person, concern, or organization having rights to the invention stating their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

Victor A. Rivas

NAME OF INVENTOR

Signature of inventor

Date

Richard Soltis

NAME OF INVENTOR

Signature of inventor

Date

Lawrence E. Sternberg

NAME OF INVENTOR

Signature of inventor

Date

APPLICATION

FOR

UNITED STATES LETTERS PATENT

FOR

PULSE RATE, PRESSURE AND HEART CONDITION  
MONITORING GLASSES

BY

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RICHARD SOLTIS and  
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PULSE RATE, PRESSURE AND HEART CONDITION  
MONITORING GLASSES

**BACKGROUND OF THE INVENTION**

This application claims the benefit of U.S. Provisional Application No. 60/101,138, filed September 18, 1998.

Adverse heart conditions may lead to fatalities and long-term ill effects. Generally, the warning signs of an adverse heart condition are not realized in time to take preventive measures to lessen the long-term ill effects. The severity of the resulting problems due to an adverse heart condition may be lessened by an early determination of the onset of such a condition. A need exists for a heart condition monitor that detects adverse heart conditions early so that measures may be taken to lessen the long term ill effects resulting from the adverse heart condition.

**SUMMARY OF THE INVENTION**

Battery and solar cell powered health glasses monitor the condition of a heart's vital signs. Light emitting diodes (LED's) emit light into human temples. Photodiodes capture light reflected back from the pulsing blood. Blood vessels expand when the heart beats. The amount of reflected light corresponds to the pulse rate. Embedded circuitry cleans and amplifies the signals, which are transmitted to light emitters located in the glasses. The same signals may be transmitted to a remote receiver to be processed and/or stored. Rhythm and shape of the pulse rate, processed on a home computer and available to doctors

via the Internet, indicates heart condition. The circuits provide signal triangulation verification and warning lights.

The sensors may be located any place on the body, i.e. wrist bands, chest, head, etc. A transmitter sends signals to the circuitry on the glasses to display reading information and lights about heart condition, pulse rate and blood pressure. Circuits on the glasses process and display electrical signals, pressure signals, pulse rate signals and combinations thereof.

These and further and other objects and features of the invention are apparent in the disclosure, which includes the above and ongoing written specification, with the claims and the drawings.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 is a schematic representation of glasses with sensors and displays.

Figure 2 is a schematic representation of the processing of signals.

Figure 3 is a schematic representation of glasses with displays and remote sensors.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Referring to Figure 1, a pair of sensing and indicating glasses is generally indicated by the numeral 1. The glasses have frames 3 with frontal lens holder portions 5 and temple pieces 7. A bridge 9 above the lenses 11 contains electronic



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Alternatively, the glasses have series of lamps 31 arranged in vertical arrays 33 and horizontal arrays 35 along the edges of the lens mounts. The lamps 31 may be illuminated individually and in groups to indicate pulse rate or blood pressure. The lamps may be of varied colors and may be focused to illuminate the glass in straight lines across the glass, or may be defocused to wash the glass with light. The light may be of uniform or select color. For example, a small green light in the corner may mean that the system is on, a yellow light diagonally across the corner may indicate that a target rate is being approached, and a white light 37 lower down and farther from the upper corner may indicate that a target rate has been reached. Lights causing a diagonal red line further down along the lens may indicate that a target has been exceeded, and purple illuminations diagonally across the centers of the lens may indicate that a target rate has been far exceeded, perhaps dangerously.

The radio transmitter 19 transmits to a receiver 41, which may be connected to a home computer 43, which in turn may be connected to the web 45 and thereby to a doctor's office 47. The computer 43 may connect to the web 45 upon exceeding of predetermined conditions, either above or below limits, so that an Internet connection may be used to alert a doctor's office 47. Alternatively, the Internet connection 45 may be used to alert an emergency service or an emergency number, such as 911. Under severe conditions, it is preferable to dial an emergency service or 911 before alerting a doctor's office.

Because exercise and muscle movements may be read as pulses, the invention uses signal triangulation verification.

Figure 2 shows a signal discriminator chip 51 which is connected to the glasses 1 and to a watch 53 for receiving a pulse rate, and which is connected to electrodes 55 stuck on a chest or other positions on a body to determine heart rate. As an example, the electrodes 55 may sense breathing rate. The signal discriminator 51 is mounted on or connected to display glasses 1, either by radios or wires, to receive pulse rate and pressure signals from the glasses, the watch and the electrodes, and to provide signals for controlling displays.

As shown in Figure 3, glasses 61 mount a radio receiver 63, which receives signals from a radio sender 65 mounted on a wrist watch band 67. A pulse sensor button 68 mounted on the inside of a watch strap buckle 69 is connected to the radio sender 65 to send pulse rate signals to the local radio receiver 63 mounted on the glasses 61. A matrix-type heads-up display of the type used in aviator or astronaut helmets displays numbers and directions. The lenses 71 may include several seven-segment or multiple element matrixes which are selectively energized and illuminated.

While the invention has been described with reference to specific embodiments, modifications and variations of the invention may be constructed without departing from the scope of the invention, which is defined in the following claims.



We claim:

1. Heart condition monitoring apparatus, comprising:
  - a pair of glasses;
  - a plurality of light emitting diodes on the glasses for emitting light onto a surface;
  - a plurality of photosensors on the glasses for receiving reflected light;
  - electronic circuitry on the glasses and connected to the plurality of photosensors for receiving signals from the plurality of photosensors; and
  - a power source on the glasses and connected to the the plurality of light emitting diodes, the plurality of photosensors and the electronic circuitry for providing power.
2. The apparatus of claim 1, wherein the power source is a battery.
3. The apparatus of claim 1, wherein the power source is at least one solar cell.
4. The apparatus of claim 3, further comprising:
  - a battery as a back-up power source to the at least one solar cell.
5. The apparatus of claim 1, wherein the plurality of photosensors are positioned in a plane offset from the plane of light emission from the light emitting diodes.

6. The apparatus of claim 1, further comprising a transmitter on the glasses and connected to the circuitry for transmitting signals from the circuitry to a remote receiver.

7. The apparatus of claim 1, further comprising a plurality of lamps on the pair of glasses for indicating a sensed condition of a user.

8. The apparatus of claim 1, further comprising a display on lenses of the glasses for indicating the sensed condition of a user.

9. The apparatus of claim 8, wherein the display is a numerical display for indicating the user's heart rate and pulse rate.

10. The apparatus of claim 1, further comprising at least one button on the glasses for inputting the user's information.

11. Heart condition monitoring apparatus, comprising:

a pair of glasses;

a plurality of light emitting diodes on the glasses for emitting light onto a surface;

a plurality of photosensors on the glasses for receiving reflected light;

a plurality of electrodes positioned on a user's body for determining heart rate;

a sensor on the user's wrist for determining pulse rate;

a receiver on the glasses for receiving signals from the plurality of photosensors, from the plurality of electrodes and from the sensor; and a power source connected to the glasses for providing power to the plurality of light emitting diodes, the plurality of photosensors and the receiver.

12. The apparatus of claim 11, further comprising:

a display on the lenses of the glasses for displaying signals transmitted by the receiver indicating a sensed condition of the user.

13. The apparatus of claim 12, wherein the display is a numerical display for indicating the user's pulse rate and heart rate.

14. The apparatus of claim 11, further comprising:

a plurality of lamps on the glasses for indicating the sensed condition of the user.

15. The apparatus of claim 11, wherein the sensor is connected to a watch.

16. The apparatus of claim 11, wherein the plurality of photosensors are positioned in a plane offset from the plane of light emission from the light emitting diodes.

17. The apparatus of claim 11, wherein the power source is a battery.

18. The apparatus of claim 11, wherein the power source is at least one solar cell.

19. The apparatus of claim 18, further comprising:

a battery as a back-up power source to the at least one solar cell.

20. The apparatus of claim 15, further comprising a radio transmitter on the watch for transmitting signals from the sensor to the receiver.

21. The apparatus of claim 11, wherein the receiver is a signal discriminator chip.

22. A method of monitoring heart condition, comprising:

providing a pair of glasses;  
emitting light onto a surface of a user by a plurality of light emitting diodes on the glasses;  
receiving reflected light by a plurality of photosensors on the glasses;  
determining changes in the amount of reflected light received by the photosensors;  
transmitting a signal corresponding to the change in reflected light from the photosensors to circuitry on the glasses; and  
determining a user's condition by measuring changes in the signals received by the circuitry.

23. The method of claim 22, further comprising

inputting target conditions to the circuitry;  
comparing the sensed condition to the target condition; and

indicating to the user the relation between the sensed condition and the target condition.

24. The apparatus of claim 23, wherein the indicating to the user comprises displaying a lighted display on the lenses of the glasses.

25. The apparatus of claim 23, wherein the indicating to the user comprises displaying a numerical display on the lenses of the glasses.

26. The apparatus of claim 22, further comprising:

sending the signal from the circuitry to a transmitter;  
sending the signal from the transmitter to a remote receiver;  
sending the signal from the remote receiver to a home computer;  
determining if the sensed condition exceeds the user's inputted target condition; and  
sending the signal from the home computer to a doctor's office through the Internet when the sensed condition exceeds the target condition.

27. The apparatus of claim 22, further comprising:

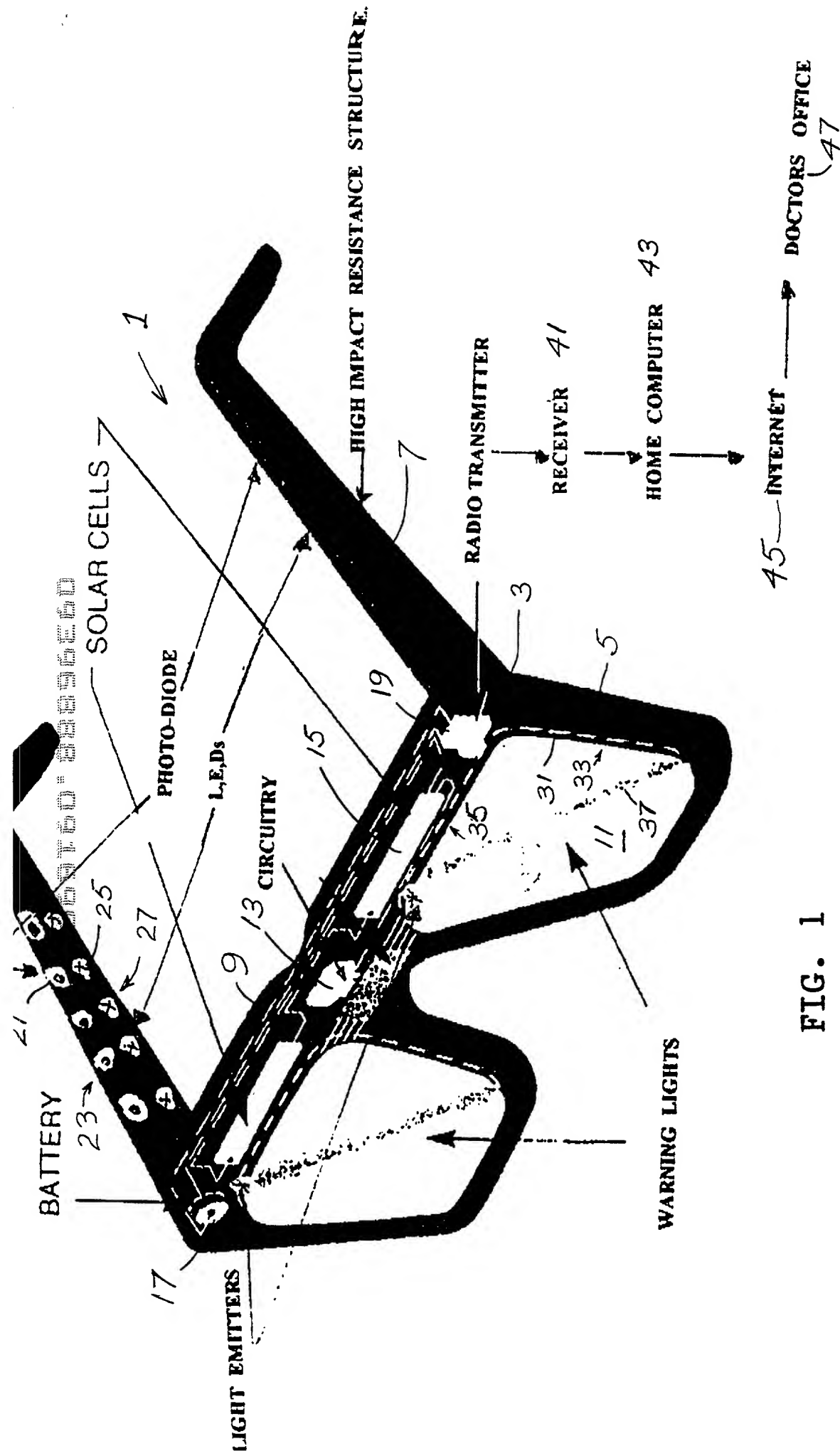
sending the signal from the circuitry to a transmitter;  
sending the signal from the transmitter to a home computer;

determining if the sensed condition exceeds the user's inputted target condition by the home computer; and  
dialing an emergency service by the home computer when the sensed condition exceeds the target condition.

28. The apparatus of claim 22, further comprising:  
placing a sensor on the user's wrist;  
sensing the user's pulse rate by the sensor; and  
transmitting the pulse rate signal from the sensor to the circuitry on the glasses.
29. The apparatus of claim 22, further comprising:  
placing a plurality of electrodes on the user;  
sensing the user's heart rate through the plurality of electrodes; and  
transmitting the heart rate signal from the plurality of electrodes to the circuitry on the glasses.

## ABSTRACT OF THE DISCLOSURE

Battery and solar cell powered health glasses monitor the condition of a heart's vital signs. Light emitting diodes (LED's) emit light into human temples. Photodiodes capture light reflected back from the pulsing blood. The amount of reflected light corresponds to the pulse rate. Embedded circuitry cleans and amplifies the signals, which are transmitted to light emitters located in the glasses. The same signals may be transmitted to a remote receiver to be processed and/or stored. Rhythm and shape of the pulse rate, processed on a home computer and available to doctors via the Internet, indicates heart condition. The circuits provide signal triangulation verification and warning lights. The sensors may be located any place on the body, i.e. wrist bands, chest, head, etc. A transmitter sends signals to the circuitry on the glasses to display reading information and lights about heart condition, pulse rate and blood pressure. Circuits on the glasses process and display electrical signals, pressure signals, pulse rate signals and combinations thereof.





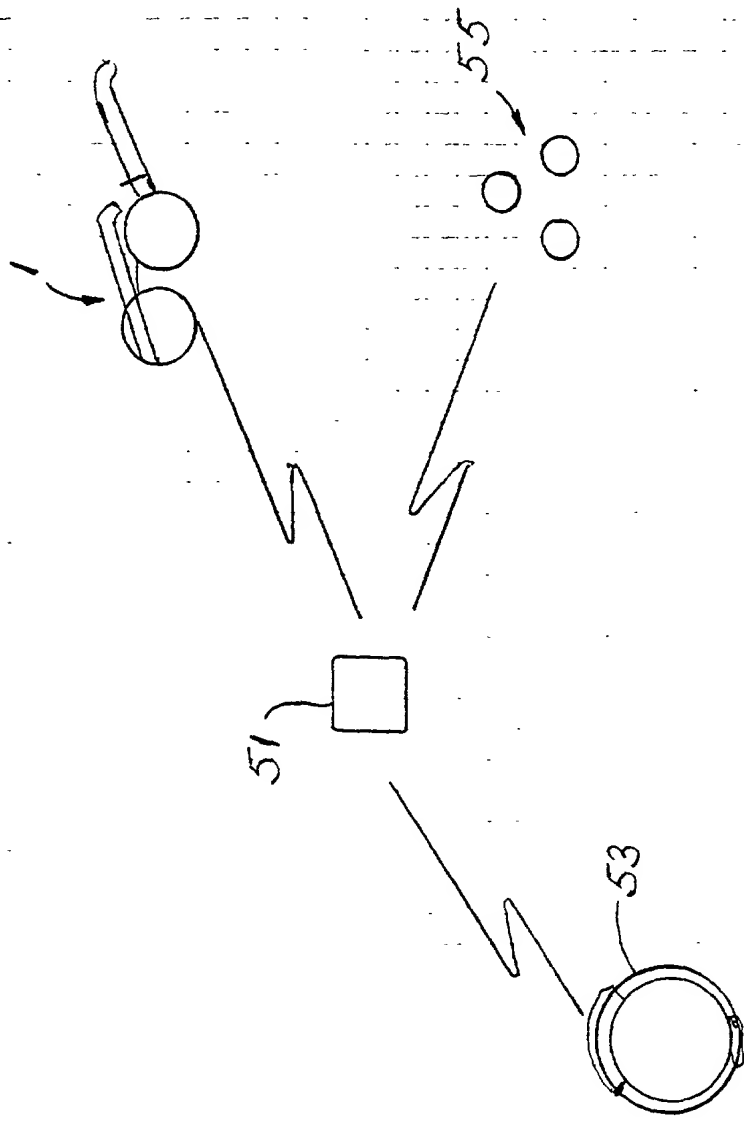


FIG. 2

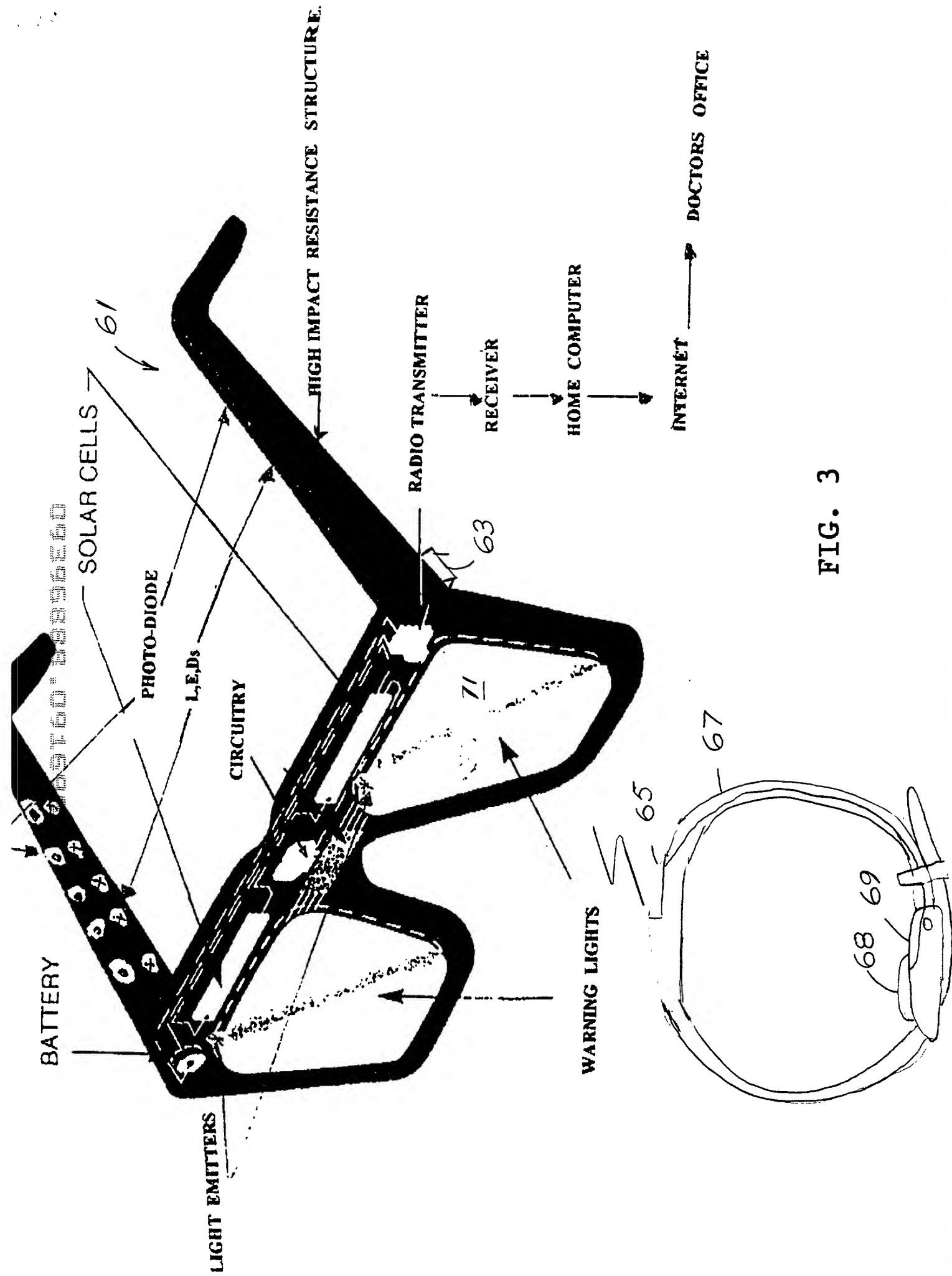


FIG. 3

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**DECLARATION FOR UTILITY OR  
DESIGN  
PATENT APPLICATION  
(37 CFR 1.63)**

☒ Declaration Submitted with Initial Filing OR ☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number

First Named Inventor

RIVAS

**COMPLETE IF KNOWN**

Application Number

/

Filing Date

September 16, 1999

Group Art Unit

Examiner Name

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Pulse Rate, Pressure and Heart Condition Monitoring Glasses

the specification of which

(Title of the Invention)

☒ is attached hereto  
OR

☐ was filed on (MM/DD/YYYY) as United States Application Number or PCT International

Application Number and was amended on (MM/DD/YYYY) (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	<input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.
60/101,138	09/18/98	

[Page 1 of 2]

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# DECLARATION — Utility or Design Patent Application

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U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)

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As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

☐ Customer Number

OR

☐ Registered practitioner(s) name/registration number listed below

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Number Bar Code  
Label here

Name	Registration Number	Name	Registration Number
James C. Wray	22,693		
Meera P. Narasimhan	40,252		
Marcus R. Mickney	P 44,941		

☐ Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.

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OR ☒ Correspondence address below

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Country	US	Telephone	(703) 442-4800	Fax	(703) 448-7397

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor:		<input type="checkbox"/> A petition has been filed for this unsigned inventor			
Given Name (first and middle (if any))			Family Name or Surname		
Victor A.			Rivas		
Inventor's Signature					Date 09/13/99
Residence: City	Lincoln	State	NE	Country	US
Post Office Address	P.O. Box 30711				
Post Office Address					
City	Lincoln	State	NE	ZIP	68503
Country	US				

☒ Additional inventors are being named on the 1 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto

09/13/99 08:00:00

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# DECLARATION

## ADDITIONAL INVENTOR(S)

### Supplemental Sheet

Page 1 of 1

<b>Name of Additional Joint Inventor, if any:</b>				<input type="checkbox"/> A petition has been filed for this unsigned inventor			
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Richard				Soltis			
Inventor's Signature		<i>Richard Soltis</i>				Date <i>9/14/98</i>	
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Post Office Address		21000 Brookpark Road					
Post Office Address							
City		Cleveland		State OH		Country US	
ZIP		44135		Country		US	
<b>Name of Additional Joint Inventor, if any:</b>				<input type="checkbox"/> A petition has been filed for this unsigned inventor			
Given Name (first and middle (if any))				Family Name or Surname			
Lawrence E.				Sternberg			
Inventor's Signature		<i>Lawrence E. Sternberg</i>				Date <i>Sep. 13, 1998</i>	
Residence: City		Lincoln		State NE		Country US	
Post Office Address		5813 Tangeman Terrace, #24					
Post Office Address							
City		Lincoln		State NE		Country US	
ZIP		68505		Country		US	
<b>Name of Additional Joint Inventor, if any:</b>				<input type="checkbox"/> A petition has been filed for this unsigned inventor			
Given Name (first and middle (if any))				Family Name or Surname			
Inventor's Signature						Date	
Residence: City		State		Country		Citizenship	
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